

P.S.
Ro
634
v.1
no.10
ROMU

MEETING PLACE

Journal of the Royal Ontario Museum

VOL. 1, NO. 10, SUMMER 1967

INTRODUCTION
SLOGGING THROUGH MUD
INDIANS OF PARRY ISLAND
SMALL FINDS FROM THE
ATHENIAN AGORA
A LIBRARY OF FISHES

MEETING PLACE is published by the Royal Ontario Museum, University of Toronto. Peter C. Swann, Editor.

This magazine and other ROM activities are supported by the membership. To become a member, write to the Programme Secretary's Office, Royal Ontario Museum, 100 Queen's Park, Toronto 5. Annual fee is \$15. Life Membership \$150. Provincial Membership (outside Toronto), \$10.

LIBRARY
ROYAL ONTARIO MUSEUM

INTRODUCTION

PETER C. SWANN, Director

The wide diversity of the articles in this number of *Meeting Place* shows how world-wide are the interests and activities of the Royal Ontario Museum. This great institution, though supported by the Province of Ontario, carries the flag of our scholarship across Canada and of Canadian scholarship throughout the world. It would be difficult to cite an organization which does so much with so little.

During this year and next, eighty publications, large and small, on the arts and sciences, will have been written—though it is difficult to see how we shall be able to publish them on a publication grant of \$14,000 per year.

In the area of purchases, the Museum has just established a Purchase Trust Fund of which the interest may be spent to fill gaps in the collections. All donations, large or small, are welcome to a fund which we hope will grow steadily over the years and enrich the country. How, as Director, one wishes such a fund had been established 20 years ago! Only those in the Museum realize what we have lost!

Nevertheless, a well-tempered optimism leads us to have confidence in the future of Canada's greatest Museum. Membership is increasing. The Planetarium is rising from the ground, new galleries are soon to open and plans have been drawn up for others too-long neglected. A new awareness is abroad of the greater role the R.O.M. can and wishes to play in an expanding society.

SLOGGING THROUGH MUD

In an unusual winter archaeological dig, ROM teams investigated the site of a pottery in Brantford

DONALD B. WEBSTER, Curator of Canadiana

Archaeological digs are not a normal winter pastime in Canada—not if there is any choice—nor, at least in the past, has digging been a customary procedure in exploring nineteenth-century industrial operations. The choice of timing, however, was not ours. Perhaps the Brantford *Expositor's* opening headline, "Searchers Slogging Through Mud, Probe Pottery Firm Site", set the tone for what was in effect an archaeological salvage investigation of the first salt-glazed stoneware pottery in Canada.

The Brantford, Ontario, pottery was established in 1849 by Justus Morton, late of the Clark pottery at Lyons, New York, and operated almost continuously, through seven proprietors and two totally destructive fires, until about 1905.

Salt-glazed stoneware pottery, fused and vitrified, impervious to liquids and inert to acids and alkalis, was the most important material known for food storage and preservation containers during the nineteenth century, before the advent of such modern refinements as vacuum canning, refrigeration, or freezing. The Brantford pottery, as its primary production, made a great variety of container stoneware, but produced as well a full range of molded and cast wares, from bowls to teapots, and from pitchers to spittoons.

The Brantford salt-glazed containers, many bearing blue-glazed decorations, are well known, since all bear a proprietor's stamped marking. The later molded wares, too, can often be identified by a BRANTFORD/CANADA marking on their bases, originally thought to postdate about 1875. The problem was, however, that while we knew the Brantford pottery was the largest stoneware manufacturer in Canada West and early Ontario, and had a quantitatively

and geographically wide market, not one shred of specific documentation had come to light (or for that matter, has yet), to indicate in detail *what* was made, beyond known marked types.

In dealing with the products of any craft or industry, the two usual avenues of attack are research into written documentation and examination of existing *known* (i.e. marked or otherwise certain) specimens. In surveying early Canadian industries—pottery, glass, iron—more than likely neither will be available to any satisfactory degree. Thus the third avenue is opened—and so to the trenches.

The Brantford pottery burned in 1872 and was rebuilt under William E. Welding in 1873. Then, in 1883, another fire gutted this second pottery building, which was rebuilt in 1884. Welding sold out in 1894; the pottery operation continued to about 1905. During the succeeding 60 years the brick building at the corner of Dalhousie and Clarence Streets in Brantford was used for every imaginable purpose—most recently, and greatly changed, as an auto dealer's showroom. I had had an eye on the site; so had Mrs. William L. McGill, Glenhyrst Arts Council President in Brantford.

Then, last December, Firestone Stores bought the site, and almost immediately the building was demolished to bare ground, including the removal of a concrete base slab which covered the long-filled pottery cellar hole. Demolition occurred on December 5 and 6. With furious site examination, telephoning, raising volunteer diggers, both in Toronto and, through Mrs. McGill in Brantford, and equipment organising, with Walter Kenyon as archaeologist, we began excavations on Saturday, December 10. Kenyon's Law—that when Kenyon arrives on a site, the rain stops—somehow failed that day. The *Expositor* headline, after freezing rain and wet snow, was an understatement.

Weather or not, on December 10 and 11 we opened two short intersecting trenches approximately underlying the main north-south wing of the 1873–1883 pottery building, and the reconstructed wing of 1884–1966. Though one trench straddled a foundation wall, we were not primarily attempting to establish the configuration of the building. There was not time; winter was upon us and Firestone was already drawing final plans for a new building to go up on the site in early spring. This was, in short, an organized pot-hunt to uncover the full range of what the pottery produced, a salvage operation pure and simple.

Round One, as we now call it, unearthed great quantities of shards of salt-glazed container stoneware, often mixed with production pieces—saggers, (unformed lumps of clay used to separate pots in firing) and setting tiles in flat sections or hollow rings. The east-west trench, dug to a depth of five feet, exposed a solid strata of tightly compacted pottery shards, beginning about a foot below the surface, two to four feet in thickness. Over 90 per

cent were remains of crushed and fragmented salt-glazed containers. The remainder consisted largely of American rockingham (stoneware with mottled yellow and brown glazes, plain, wheel-turned work without molded patterns), as well as yellow-ware or mocha, from yellow glazed bowls with circumferal white and brown lines.

Those salt-glazed shards which were marked bore the stamps of Welding and Belding (1867–1872) and W. E. Welding (1873–1883). No marked rockingham or yellow glazed ware was found; the BRANTFORD/CANADA marking was completely absent.

Four small tobacco or sugar jars were recovered in reconstructable form, and dozens of extra lids. Three one-quart-sized bottles emerged; only half-fired, as we discovered later, for an obvious reason. Nothing was intact except for the most unexpected find, a few salt-glazed school-house inkwells, unmarked and previously unknown.

The City of Brantford, which had very kindly surrounded the site with snow fencing and loaned us shovels, closed the survey trenches with a bulldozer (we had promised Firestone to leave the site as we found it). With a hundred or so bags of shards to go over, we now had just enough to whet our appetites for Round Two in the spring. Firestone was uncertain when building would commence; we planned our return to the site for as late in the season as possible, but a week or ten days in advance of contractors.

After overcoming logistic problems of correlating schedules with excavating and building contractors, and several false starts, substantially reinforced with equipment and student volunteers, and now also a grant from the Ontario Historic Sites Board, we opened new trenches on March 13. We planned on daily runs from Toronto for two weeks, less days certain to be lost because of bad weather. Firestone's contractors had scheduled their excavating for the 20th.

Speed was essential. Since we were primarily after examples of pottery best extracted from the exposed walls of trenches, Walter Kenyon, before departing for Florida and British Honduras, had felt that the most expeditious system would be to get our trench walls as quickly as possible. Material removed in the process would be expendable. The Mayor of Brantford, R. B. Beckett, had previously offered us a backhoe, courtesy of the city, which we declined in the mud of December. Now, with contractors pushing, and six to nine inches of frost in the ground, we accepted, and found on our arrival on the 13th a huge machine with driver waiting to go to work.

Along the Dalhousie Street frontage of the pottery cellar hole, and under that wing of the 1873–1883 and 1884–1966 pottery buildings, we excavated a trench 80 feet long by four feet wide and six feet deep—a foot below the level of undisturbed soil. Then, under the Clarence Street wing we ran a perpendicular trench 40 feet long. Finally the backhoe dug five short

subsidiary trenches, three in from Dalhousie Street, to intersect the main trench; and two to intersect from the opposite side. With trenching completed in four hours that would have taken a shovel crew two weeks, we now had a completely adequate section of the cellar hole opened.

The backhoe also dug four test holes in what from 1873 to 1883 had been the outer yard, bringing up sand and brick rubble, but no pottery whatsoever.

About a foot below surface, over most areas of the trench walls, there was a carbon layer of semi-burned wood, including charred beams and boards. Below this the strata of compacted pottery shards ranged in depth from three to five feet below surface, in most areas mixed with brick. The pottery strata was thoroughly mixed with and imbedded in white wood ash—sometimes quite loose, but nearer the surface cemented almost to the hardness of concrete.

In surveying the pottery strata, we found the lowest levels to be composed entirely of salt-glazed and unglazed stoneware, from heavy containers. This was thoroughly mixed with production setting tiles and saggars, brick, dirt and ashes. The upper levels, directly beneath to two feet below the general carbon layer, included a heavy proportion of salt-glazed shards. In different areas heavy concentrations were found of rockingham-glazed milk bowls and pie plates, without pattern molding, numerous varieties of small yellow-ware bowls with white and brown banding, rockingham-glazed molded and patterned teapots, pitchers, bowls, and spittoons, unglazed flower pots, and semi-fired stoneware of all varieties.

In all areas, shards were occasionally stuck together by remelted glazes. In the Dalhousie-Clarence Street corner there emerged from the upper levels burned and distorted window glass, and shards and teapot lids with window glass adhering. Many shards, of all pottery varieties, were coated with soot. Glaze colors were often distorted; once brown and yellow rockingham glazes had a pearly hue, but no iridescence or encrustation; salt-glazes and once brown Albany slip coatings varied from mustard yellow to olive green.

Markings on salt-glazed wares from the lower levels were typically Welding & Belding (1867-1872), with a very few stampings of Morton & Co. (1849-56) and F. P. Goold 1863?-1867). Those from upper levels were entirely W. E. Welding (1873-83). None of the rockingham wares, plain or with molded patterns, were marked in any way, nor were the yellow-wares. The marking BRANTFORD/CANADA, commonly seen on existing molded rockingham and blue or green glazed pieces, as in December was entirely absent.

Though many dozens of bags of shards remain to be washed, much less completely assessed, the overall pattern is now clear. From this survey, completed and the trenches closed on March 22, it is evident that we have

not a picture of production over the pottery's entire span, but a concentrated view of forms and varieties of pottery in production and in stock during each of the two fires of 1873 and 1883.

The first pottery (1849/1872) was a wooden building; we have no contemporary view, plan, or even description of it. Constructed evidently with its first floor at or near ground level, it burned into a six-foot cellar. Production in 1872 consisted entirely of salt-glazed or brown glazed containers; there is no evidence of molded or finer wares, or of varied glazes. The heavier fire rubble in the cellar hole was compacted and levelled, not removed, in rebuilding.

Welding's building of 1873 was brick—we have woodcut illustrations of this and it too burned into the cellars in 1883, leaving the walls standing. Into the cellars, too, during the fire dropped everything in stock and stored on upper levels. The fire was sufficiently hot to semi-fire finished but unfired biscuit pottery, and to distort metallic oxide-silicious glazes (perhaps 1000–1200° F.) but not to re-fuse or warp finished stoneware pottery (2200–2300° F.).

The reconstructed building of 1884, later extended and expanded, was built within the walls of the earlier building, which had remained largely intact. The cellar hole, never cleaned out, was surfaced with earth, and the pottery in this area after 1884 operated on ground level. A concrete slab was added later. New cellars along Clarence Street to the north were dug for the 1884 building and these existed well into the twentieth century, but were cleaned before ultimate filling. Test holes showed no pottery.

The bulk of the Brantford pottery's production was always salt-glazed containers. Manufacture of finer wares began evidently in the late 1870s, in forms never previously identified, since none is marked. Brantford was, in fact, one of the first potteries in North America to produce yellow-wares, and it may have been the earliest Canadian producer of rockingham.

The wares commonly found with the BRANTFORD/CANADA markings, previously thought to date from the 1870s were, in fact, certainly not made prior to the late 1880s and very likely post-date 1894, when Welding sold out to a joint-stock company.

The Brantford digs, in spite of physical and logistic conditions somewhat less than ideal, were eminently successful. First, we have gained an intensive picture of Canada's most important pottery's entire variety of manufactures during two precisely defined periods. A great gap, knowledge of those unmarked and previously unidentified finer wares made between the known saltglaze of the 1860s and the marked products of the '90s, is now filled. Though perhaps less important, the survey also has confirmed what documentary evidence we have on ownership and operations of the pottery, as the documentation has, conversely, confirmed recoveries from the dig.

INDIANS OF PARRY ISLAND

The rise and fall of Algonkian farming

EDWARD S. ROGERS, Curator of Ethnology

One of the little-known aspects of the Indians of southern Ontario is that many once were rural Victorian era farmers. This was particularly true of Indians who lived on Parry Island, as I discovered during field work among Indians still on the Island in the summer of 1963. With financial support from the National Museum of Canada, I was able to investigate further, both in the field and in the library, some of the factors responsible for the development of farming among the Indians and why it disappeared.

Before 1800, the Ojibwa Indians of southern Ontario frequently planted small gardens although they were primarily hunters and fishermen. As early as the 1830s some groups—Cape Croker, Christian Island, Rama, and Rice Lake—began to settle and till the land like their non-Indian neighbours. But the Parry Island Indians did not really settle down to farming until the latter half of the last century.

In 1850 the Indians of Georgian Bay signed a treaty with the government by which they surrendered all their lands and in return were given certain designated areas. Ojibwa in the Muskoka district were given Parry Island where they soon settled. Other Ojibwa from the north shore of Georgian Bay joined them and in 1877 Potawatomi and Ottawa took up residence on the Island having originally come from Wisconsin. At this time there were 74 Ojibwa, 41 Potawatomi and Ottawa and 12 other Indians, probably Ojibwa, resident on Parry Island, giving a total of 137.

As the Indians settled on Parry Island they established three villages. Each village was composed of from five to ten homes of squared logs with board roofs. Associated with each house were barns for housing the livestock and in back of each homestead were the fields. It is estimated that several hundred acres were under cultivation at one time. Two of the villages had a church—one Catholic, the other Methodist—a cemetery and a school house. And one of the villages had a Community Hall.

They grew corn, beans, potatoes, peas, carrots and other vegetables, some wheat and timothy hay. One variety of corn still occasionally grown was a surprise. It is an ornamental popcorn from Mexico. How it got to Parry

Island is a mystery but it may have been brought there by the Potowatomi, the only Indians who grow it at present.

Livestock at first consisted only of oxen, although later in this period they were replaced by horses, and cattle, pigs, sheep, chickens, turkeys, geese and ducks.

The usual techniques of agriculture were practised. The land was worked with horses and ploughs and harrows. The crops were planted and tended with a hoe. The men did the ploughing and harrowing and both men and women hoed the crops. After planting, the crops were tended during the summer until ready for harvesting in the fall. After harvesting, the crops were prepared for storage and some were placed in root houses. Other produce might be dried and kept in the homes. Squash, for instance, was cut in slices and dried. Some of the garden produce also was taken to Parry Sound and exchanged for store foods such as flour, pork and salt. As well, at this time of year the people fished. Large quantities were caught and salted down for winter use.

During the winter, farming activities naturally were restricted although there were still chores to be performed. Livestock had to be cared for and repairs made. Large quantities of firewood had to be cut for heating and cooking. The men carved axe handles and ladles for sale and the women made quill boxes, splint baskets and moccasins.

With the arrival of spring, families moved out of the villages to the sugar bushes and collected the maple sap. The trees were tapped with wooden spiels and the sap collected in birchbark containers. Two hundred or more trees might be tapped by one large family group and as many as 1,000 containers might be employed. Once the sap was collected, it was stored in large elm and basswood troughs to await boiling in large brass and iron kettles. The sugar was stored for later use in birchbark boxes, and some of the sugar, before it hardened, was poured into wooden moulds. Near the end of the maple sugar season the people began to prepare to plant their gardens.

What stimulated the Indian peoples of Parry Island to undertake farming to this extent? The Wesleyan movement undoubtedly had an effect. They promoted agricultural pursuits among the Indians of southern Ontario and many of their ministers were of Indian extraction and worked closely with their own people. The Reverend Allan Salt, missionary at Parry Island, was from Rice Lake. Also, no doubt, the Indian peoples at this time desired to emulate their non-Indian neighbours and to live a life similar to theirs, now that trapping and hunting were no longer fashionable or profitable for them.

But why, after the First World War, was farming no longer important to the Indian peoples after such a promising beginning? What factors might

explain the disappearance of farming among the Indians? In general, they farmed relatively marginal land and with the increasing technological complexity of agricultural subsistence it was no longer really practical for them to continue. Furthermore, during the First World War there was a high enlistment of Indian men in the services and the women who remained at home were unable to carry on effective agriculture. Also, in the 1920s apparently many of the men sold their livestock for cash with which to purchase cars, a rather new innovation. In addition, training received in trade schools had given them opportunities for employment which could only be found elsewhere and many began moving to the cities. Finally, the development of the tourist trade and utilization of Indians as guides took them away during the summer months when farming would have been undertaken.

Today only about 75 Indians remain on Parry Island. Several hundred have moved elsewhere—Cleveland, Detroit, Toronto—where they are gainfully employed. Only a few of the elders have gardens each summer. Gone are the horses, cattle, pigs and chickens.

"SMALL FINDS" FROM THE ATHENIAN AGORA

Pottery, jewellery, coins, lamps and other modest objects provide details of everyday life in ancient Athens

MRS. NEDA LEIPEN, Associate Curator-in-Charge, Greek and Roman Department

Although habitation is attested on the site of the Agora in Athens as early as the Late Neolithic period (before 3000 B.C.) and continuing through the Bronze and Early Iron Ages, its function as the city's main square (ἀγορά, public meeting place) did not start before the early 6th century B.C. when, in the time of Solon the Lawgiver, the first public buildings were constructed. It is the Agora of this and later periods that the classical writers refer to when they mention or describe the various religious, administrative, judicial and political, commercial and social activities that took place in the area.

Pausanias, a Greek traveller and geographer who lived in the 2nd century A.D., left us a detailed topographical account of the site, invaluable to the archaeologist. In a number of "sightseeing" walks through the area he noted the various temples and sanctuaries, the administrative buildings, and the long colonnaded porches or stoas, in whose cool shade the Athenians practised their love for dialectics. Above all Pausanias selectively recorded the works of art, statues and paintings he saw around and inside the buildings. Many of these have been identified in the course of modern excavations.

Besides the rich architectural and sculptural remains, however, excavations of the site have produced a great wealth of more modest objects reflecting various aspects of life both public and private that for many centuries went on in the area. Pottery, lamps, coins, weights, measures, judicial equipment, jewellery, terracotta and bronze statuettes, and a host of other "small finds", tell us of the everyday life of the people that inhabited or frequented the area from the early Greek through the Roman, Byzantine, Frankish, and Turkish times.

The first annual field campaign in the Agora was undertaken in 1931 by the American School of Classical Studies, and a regular excavation programme in the area has been maintained by the School ever since. The University of Toronto is one of the group of about one hundred universities in the U.S.A. and Canada that contribute regularly to the support of this school and share in its benefits. The results of the Agora excavations have since 1953 appeared in a systematic series of comprehensive Monographs. Under the guidance of Professor Homer A. Thompson, Field Director of the Excavations, a dozen exhaustively illustrated volumes have so far been published. Each deals with a different category of objects, and each contributes to a more complete understanding of the way of life, the history of the most brilliant City State of ancient Greece, and of Greek civilization in general.

The meticulously kept excavation records have allowed typological and chronological sequences of the finds to be established. This is particularly important in some hitherto more or less neglected and poorly recorded categories, such as the "lowly" Roman coarse ware pottery (*Agora*, Vol. V, Part I, by Henry S. Robinson), or the Roman terracotta figurines and plastic lamps (*Agora*, Vol. VI, by Claire Grandjouis). Anybody encountering the same type of object at some other site, or studying it as an isolated find without recorded provenience—which all too often is the case with museum acquisitions—will find the *Agora* publications of greatest help. A properly established chronological sequence of such common finds as Roman kitchenware or lamps is also most valuable in dating other finds when discovered in context with them.

Last year Professor Thompson asked me if I would take part in the study

of the "small finds" from the Agora which in collaboration with Prof. Anna Benjamin from Rutgers, the State University of New Jersey, is eventually to appear as yet another volume in the series of the Agora Monographs. Dividing the finds by the materials from which they are made, Dr. Benjamin has worked on objects of bone and ivory, stone, and miscellaneous clay, and I have started on "small finds" of bronze. During July and August 1966 I worked in the Agora Museum, the reconstructed Stoa of Attalos, situated along the east side of the main square. This long, two-storey building with upper and lower double colonnades was built in the 2nd century B.C. by Attalos, the philathenian king of Pergamon, as a gift to the city of Athens. Reconstructed on and from the existing remains in the 1950s by the American School and under Prof. Thompson's supervision it now serves as the Agora Museum and, "behind the scene", as a vast storage of the finds from the area, combined with offices and workrooms.

What are "small finds"? one might ask. I think that no strict definition exists but generally they are rather small and simple objects used in everyday life, during peace or in wartime; anything from fishhooks, keys, or arrow-heads to more elegant items such as jewellery, cosmetic implements, or furniture fittings. In publications they are usually classified into several main categories which in turn are subdivided into more specialized groups.

Of the large amount of small bronzes found in the Agora I have so far catalogued a fair amount of jewellery and dress accessories including finger rings, earrings, pendants, bracelets and belt buckles. The rings are typologically rather well represented including mainly Hellenistic, Roman, and Byzantine examples (4th century B.C. to about 12th century A.D.). Most of the earrings are late, coming chiefly from the Byzantine graves in the area. I was pleased, however, to find among them four single earrings, or rather ear pendants, of the so called inverted pyramid type so popular in the classical Greek period (5th and 4th centuries B.C.). Being of bronze, they are simple cast from moulds, details of decoration and all, obviously to save the time and work that went into their more precious handworked counterparts of gold. Most of the pendants are of the Byzantine period, cross-shaped and often inscribed, but some Roman amulets can be found as well. The Greek and Roman fibulae are represented but the later decorative belt buckles, usually associated with the Barbarian invasions in the early Middle Ages, and one of the best clues to the movements of the invaders, are much more numerous.

The keys are of different varieties, from the finger ring type of the late Roman period to the Byzantine hinged-handle type. They all are equipped with highly diversified patterns of teeth and wards indicating the care the ancients took in securing their property. All these objects are but a small part of the vast amount of the metal finds from the Agora yet to be studied.

Although modest and hardly ever of artistic merit the small finds are of no less archaeological importance than the more spectacular sculpture and painted vases, or the architectural remains. They are unassuming but most authentic documents of the ancient daily life and customs. They help us to visualize vividly not only the events of historical importance—remember only the great number of ostraka inscribed with the name of this or that prominent Athenian of the Golden Age voted to be exiled in order not to endanger the democracy—but they also teach us about the mode of life of the ordinary people, their religious beliefs and practices, their taste in adorning themselves and their homes, their ways in bringing up and educating their children. The small objects also show the technical methods used in different trades and handicrafts. Ancient writers do not necessarily mention all these details of everyday life, small in themselves but important for a student of antiquity. But when they do, we are immensely gratified to find their statements or descriptions confirmed by actual finds. Sometimes, of course, we find strange objects for which there is no explanation in ancient texts and at whose use we can only guess.

The numerous finds from the Agora encompass all the periods, from the Late Stone Age through the Byzantine and Turkish periods, spanning about 5,000 years. The continuity of this long span tells us something of the importance the site played in the history of Greek civilization. Great progress and, at times, great defeat at the hands of the Persians, the Romans, and the Barbarians, are all reflected in the finds; their quantity and the quality of their workmanship always are related to the political ups and downs. More finds, small and otherwise, are expected in the near future when the projected excavation of the north side of the Square begins.

The excavating and the research staffs of the Agora usually return home to their colleges and universities early in September leaving the offices in the Stoa in care of a few Greek and American members of the permanent staff. In spring or early summer the "crews" return to resume their work in the field or on publication of the Agora material.

A diorama of the Agora with the Acropolis in the background is in the Athens Gallery of the Royal Ontario Museum. On display since the opening of the gallery in 1962, the year the Museum celebrated its 50th year, the diorama shows the Square as it was at its best period about 100 B.C. when all the most important and distinctive buildings had been built, and before damage by the besieging Romans in 86 B.C. A model of the Athenian Acropolis and other three-dimensional models and reproductions make the Athens Gallery, a gift of the Walter C. Laidlaw Foundation, an excellent teaching instrument and the next best thing to an actual visit to Athens and its monuments.

A LIBRARY OF FISHES

What is a research collection? How is it used? A behind-the-scenes look at the Museum's vast "library of fishes".

DR. W. B. SCOTT, Curator of Ichthyology and Herpetology

Basic to the function of the Royal Ontario Museum is its research collections. But the use made of them is seldom described or explained. The public sees the galleries of display materials but usually is quite unaware that the museum's most valuable assets are its research collections which, in the zoological sciences, are never on display.

What is a research collection? Essentially it is an organized grouping of related, documented specimens; documented in that the origin, collector, date, environmental conditions at time of collection and numerous other data are known and recorded.

A research collection may be compared to a reference library. Each specimen is a bundle of information available for study by a succession of researchers, each of whom may make a contribution to knowledge. With the planned growth of a collection, its usefulness and value continues to increase. However, unlike a library, where many of the volumes can be replaced, a research collection contains "single copy prints" which are irreplaceable, although sometimes substitutes may be found.

The foregoing general comments about zoological collections may be illustrated by one particular collection, that of the Department of Ichthyology. On the ground floor of the ROM, the Department has one of the largest reference collections of fishes in Canada (only that of the Institute of Fisheries, University of British Columbia is of comparable size) and the most complete collection of Canadian fresh water fishes in the world.

In fishes, the concept of uniqueness embodied in the "single copy print" idea is particularly true because fishes are molded by their environment. Many of their structural features, such as the number of scales or plates, the number of fin rays and even the number of vertebrae, are influenced by such environmental conditions as temperature and salinity. Most fishes in temperate and boreal waters also carry their life history on their scales, an effect of seasonal growth instead of the more uniform growth experienced by tropical fishes.

The ROM's research collection of fishes consists of approximately 26,000 catalogued units. One catalogue unit may consist of one specimen or 300 specimens, or even more. In all, approximately 500,000 specimens are avail-

able for study. These are whole fishes that are first fixed in a formalin bath, then washed out in water and finally stored in 65 per cent alcohol in bottles and fibre-glassed-lined boxes. These containers are arranged in an order that reflects the broad relationship of the fishes, one species to another.

Catalogued specimens are entered on 3×5 index cards and filed in such a way that all records of a given species are grouped and then arranged geographically. From these card records, distribution maps are prepared and periodically brought up to date so that the known Canadian distribution of any species is available.

The collection of fishes, like many museum collections, originated as a teaching collection and still serves in this capacity today. A high percentage of Canadians working in the field of fisheries in Canada have used the collection, not only during their undergraduate and/or graduate years, but later during their professional careers. However, in recent years recruits to this field increasingly are drawn from universities in the United States because Canadian training programs fail to meet the demand. Students from nearby universities, groups of high school students, Department of Fisheries inspectors, and Conservation officers in training are among the many who make use of the facilities.

A good collection is created not only by staff collecting, although this is the best way, but also by exchange. By exchange arrangements with foreign institutions, specimens of great biological significance can be obtained for teaching and study.

Most collections grow by study and acquisition of materials close at hand, gradually moving farther afield as interest and knowledge increases. During the acquisitive, or faunal survey stage, the press and the public generally are most interested. But public interest palls during the assimilation process when the materials gathered are being studied. Thus, oceanographic voyages and African expeditions attract much attention, but little is heard of the results achieved, possibly because the scientists involved do not believe that anyone but other scientists would be interested, or they do not translate their findings into language acceptable to non-scientists. Whatever the reason, the communication gap is unfortunate and the public is the loser.

Traditionally, zoological reference collections are used as an aid in the identification of unknown animals sent to museums by other biologists. While there is always a special thrill in working with an unknown fauna from a distant land, all too often the material for identification is fragmented; it may have been removed from the stomach of another animal, from an archaeological site or an ancient Indian encampment. Fragmented remains usually require considerable study before a positive diagnosis can be made. However, the first indications of new or previously unknown fishes often have been found in just this way, and such material cannot be brushed aside.

This service aspect of museum business can be, and in the ROM is, a

time-consuming and demanding role and one that we have so far been pleased to continue, providing our customers are prepared to be patient. Of the 25 accessions received in the ROM's Ichthyology Department in the first three months (the "quiet" months) of 1967, half are requests for identification. Some examples are fish bones from an Indian midden in Michigan; a collection of freshwater fishes from Guyana, South America; bird stomach contents from British Honduras; stomach contents from Atlantic fishes and freshwater fish collections taken during pollution studies in Ontario and the Maritime Provinces. During the last 20 years, hundreds of similar requests have been answered.

The preparation of reference books and guide books to regional fauna would seldom be possible without access to well organized collections. This is why most of the guide books available to the public are written either by museum staff members, or by those who have been granted free access to the collections (for example, Godfrey's *Birds of Canada*, Kortright's *Ducks, Geese and Swans of North America*, Peterson's *Mammals of Eastern Canada*, and Leim and Scott's *Fishes of the Atlantic Coast of Canada*. Living material is used whenever possible but adequately preserved and documented reference specimens are essential for the preparation of accurate descriptions, drawings, etc. Examination of stomach contents reveals food habits, study of scales permits age and growth analyses and X-rays reveal details of internal structure.

But, as obvious and direct as these services are, they are not the most important in the eyes of the curators who work with the collections. To them the most important studies are those concerned with the tracing of pathways by which organisms have evolved, the genetic relationships of biological groups and the geographical distribution of animals. Such fundamental studies often are the reason the zoologist first seeks employment in the museum.

Those who work in this general field of systematic zoology are called systematists or taxonomists, since they study the kinds and diversity of organisms and their relationships. Systematics is a most fundamental branch of biology since, as stated in a recent newsletter from the United States National Research Council ". . . organisms cannot well be discussed or treated in a scientific way until some taxonomy has been achieved—it (systematic biology) is also the most inclusive, since in its various aspects it gathers together, summarizes, and utilizes everything that is known about living things, whether morphological, physiological, behavioural, or ecological."

Sometimes the ROM has been called "a storehouse" and perhaps in a sense this may be appropriate. But it is a special storehouse that provides a unique service to the public—a record of nature through the ages.